National Aeronautics and
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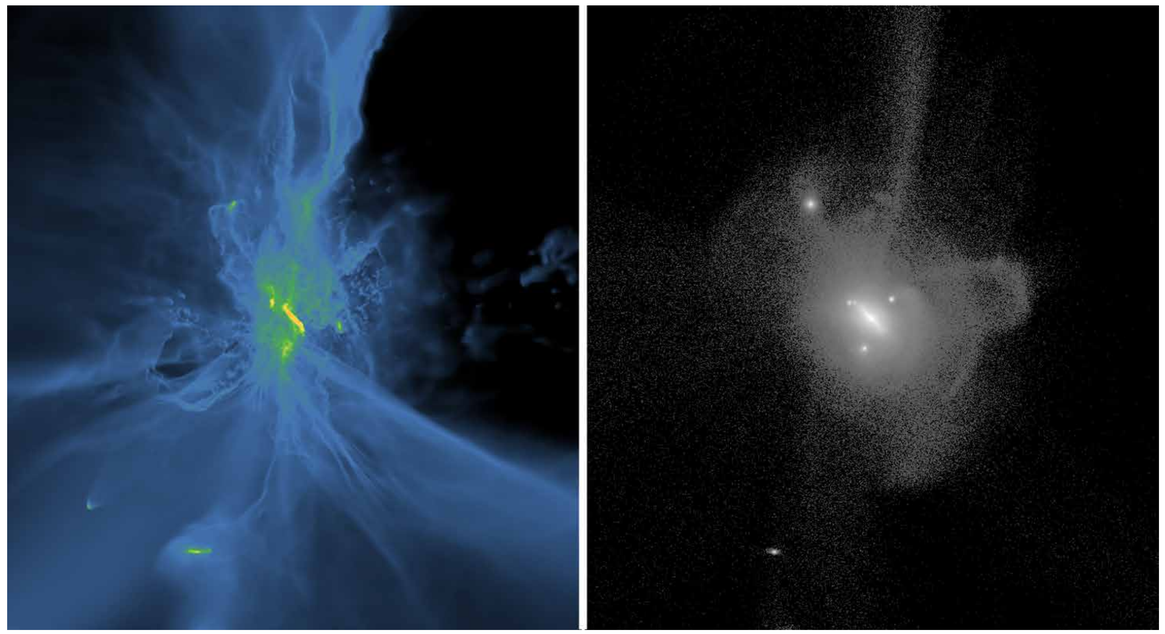
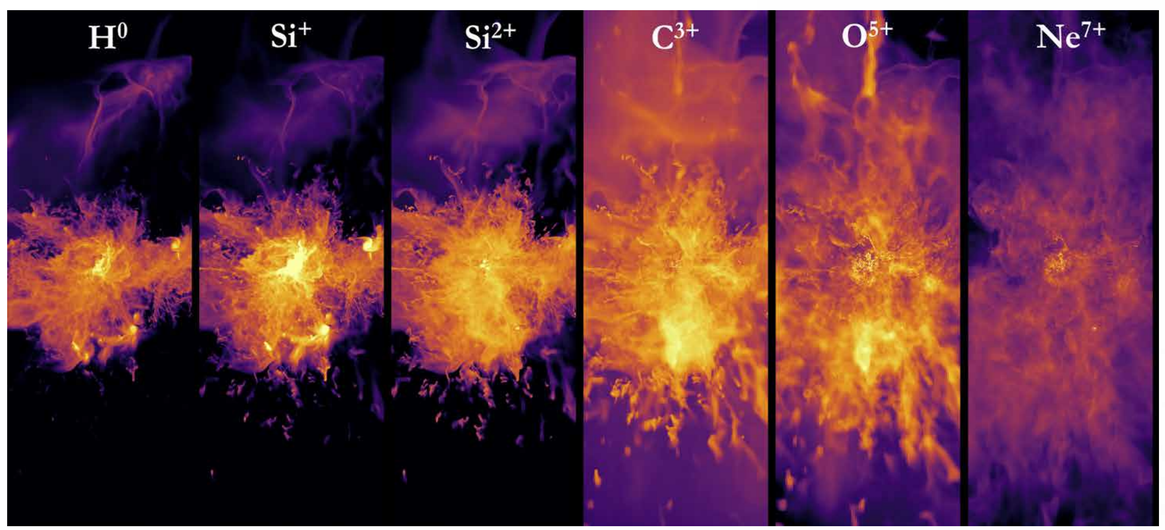


Snapshot of a visualization showing gas (left) and stars (right) in and around a simulated galaxy. While the starlight is easy to observe, it does not tell the whole story of what the galaxy is doing. The gas density is highest (orange/yellow) at the center of the galaxy, but the lower-density gas (blue/black) still exhibits complex structure. The simulation was run by the Figuring Out Gas & Galaxies In Enzo (FOGGIE) project using the Enzo cosmological hydrodynamic code. *Raymond Simons, Space Telescope Science Institute (STScI); Molly S. Peeples, STScI/Johns Hopkins University*



The diffuse gas outside of galaxies is observed by using different ions, shown here with higher column densities in yellow and lower column densities in black. Lower ionization gas, such as neutral hydrogen or singly-ionized silicon, traces cooler and denser gas found closer to the galaxy. Higher ionization gases, such as O^{5+} or Ne^{7+}, trace the hotter and more extended gas further from the galaxy. Simulations such as this one help us figure out how to disentangle this suite of observed ions in terms of the large-scale gas flows into and out of galaxies. *Molly S. Peeples, Space Telescope Science Institute/Johns Hopkins University*

Simulating the Diffuse Gas Surrounding Galaxies

Galaxies acquire gas from the cosmic web. As they convert this gas into stars that then blow up as supernovas, gas enriched with freshly produced heavy elements is expelled back into the galaxies' diffuse environs. Thus, to understand how galaxies evolve through cosmic time, we must understand the physics governing the extensive and massive reservoirs of extremely low-density gas surrounding them.

Though this circumgalactic gas is structurally and kinematically complex, its low density makes it difficult to observe directly. With cosmological simulations evolved on NASA's Pleiades supercomputer, we model how galaxies and gas change through time. Mock data generated from these simulations then helps us interpret real data.

Molly S. Peeples, Space Telescope Science Institute/ Johns Hopkins University

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